COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF ALASKA FAIRBANKS

Growing Apples in Interior Alaska

Suitable Varieties for Cold Climates

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HGA-00043

Apples are a favorite fruit in many cultures and countries around the world. Originating in western Asia, apples have been cultivated for thousands of years. There are 7,500 known cultivars of apples, but only a handful of these are commercially produced.

In Interior Alaska, apples have primarily been grown in the crabapple form. There are many apple and small fruit growers successfully growing fruits throughout the state, yet finding suitable varieties for the harsh Interior winter can be challenging, However, there are a few successful apple growers in Fairbanks who have spent years cultivating trees suitable for growth in the Interior.

In order to test which varieties of apples might grow best in Interior Alaska, a trial program is being conducted at the University of Alaska Fairbanks Experiment Farm. The trial began in 2007. Fruit trees were planted inside and outside of two large high tunnels. High tunnels (also known as hoop houses) are metal- or wood-framed, plastic-covered structures that have removable end walls and adjustable side walls. High tunnels are particularly suited for cold climates as research has shown that they can provide significant season extension and increase the yield and quality of some crops. For more information on high tunnels, see Extension publication HGA-00028, *Hoop Houses in Rural Alaska*.

So far, trees in the tunnels have had a clear advantage, as displayed by their greater general size overall, earlier bud and leaf out, and partial flowering and fruiting after only the first season. The outside trees have had very limited flowering and have produced no fruit to date (2011). For survival rates, see "Fruit Tree and Berry Crop Trial" on page 3.

Variety selection and pollination

Apple trees usually require cross-pollination, that is, pollination by another variety. This is something to take into consideration when selecting your varieties. It's best to have at least two varieties that flower at about the same time or at least have some overlap. All of the trees tested in the fruit tree trial flowered at about the same time or within one week of one another. Some growers use honey bees to ensure pollination in their orchards. Although there were no hives at the site of the trial, pollination did not seem to be a problem. It's possible that other insects besides honey bees are successful pollinators; bumble bees, moths, butterflies and various types of flies were all observed in the high tunnels. The most successful varieties — those with high rates of survival and those that flowered and produced fruit— are listed in Table 1. These apples were all grown in a high tunnel.

Most of the varieties in Table 1 were best when consumed directly after harvest. A few remained palatable in cold storage for a week or two (e.g., PF-12 and Prairie Sensation). According to local growers, some of these varieties, such as Lee 17 and 8919, can stay in cold storage for up to two months or more.

Rootstock

Apple trees, like many fruit trees, are grafted. Apple trees are usually made up of two components,

Table 1. List of varieties from the trial with harvest time and fruit characteristics listed (sizes based on diameter of apple as follows: small = under 2 inches, medium = 2–3 inches, large = > 3 inches).

Variety	Harvest Time	Fruit Characteristics
8919	Late August/early September	Small to medium sized, green with red blush, tart flavor, crisp
Advance	Mid- to late August	Small, green/red, sweet and tart, crisp
Arctic Red	Mid- to late September	Crabapple, red, tart, very crisp
Golden Uralian	Mid-August to early September	Small, yellow, sweet, great right off the tree, soft texture
Heyer 12	Mid- to late August	Medium, yellow green, tart, crisp
Lee 17	Late August/early September	Large, yellow-red, sweet-tart, crisp
Lee 21	Late August to early September	Medium to large, yellow, tart, crisp
Norhey	Mid- to late September	Medium, yellow/green, sweet and tart, crisp
Norland	Mid- to late September	Medium to large, red/green sweet and tart, very crisp
Novosibirksi Sweet	Late August	Small to medium, green/red, sweet, appearance not appealing but very tasty and crisp
Parkland	Late August/early September	Small to medium, red/green, sweet, tart, excellent right off the tree, medium crisp
PF-12	Late August/early September	Medium, green with red blush, sweet, tart and crisp
Prairie Sun	Early September	Medium to large, green with red blush, sweet, tart, medium crisp
Prairie Sensation	Late August/early September	Medium to large, red/green, sweet, tart, crisp and delicious
Red Heart	Early to mid-September	Crabapple, red, tart, good for juicing
Ukalskoje Nalivnoje	Mid- to late September	Medium, green/yellow, sweet, soft texture, very flavorful, fragrant

a rootstock and a scion, two different varieties chosen for specific characteristics. Rootstock is the variety onto which the scion will be grafted and is usually chosen based on qualities such as winter hardiness, tree size and resistance to soilborne disease. The scion is the young shoot or twig of the variety that is to be grafted onto the rootstock; it is chosen based on the cultivar or variety of fruit you wish to produce.

All of the apples in the trial were grafted onto a rootstock of Siberian origin. This rootstock is very hardy and able to withstand temperatures as low as -40°F and produces a standard to full-size tree. Dan Elliott, a fruit grower from Wasilla, prepared multiple grafts — four to eight of each of 31 varieties, including a few crabapples — onto the rootstock. The rootstock was obtained from Lawyer Nursery in Montana. Fairbanks apple grower Clair Lammers, who has been growing apples for 20 years in Fairbanks without high tunnels, helped select varieties for the trial.

Site Selection

Apple trees need plenty of sunlight and good soil drainage. Plant your trees in an area where they will get full sun for most of the day or at least half of the day and receive some protection from the elements. If planting in a high tunnel, choose an area that is not subject to strong or constant wind. There are many different sizes of high tunnels that might be suitable for your site.

Fencing is strongly recommended, since moose absolutely love apple trees! Voles, rabbits and even porcupines are also quite fond of apple trees. Individual tree guards, such as plastic tree guards or hardware cloth (wire screening), are recommended to protect trees from these smaller creatures. These guards should be removed in the summer.

Spacing and Planting

The spacing of your trees is dependent on how many trees you are planting. Generally, trees can be planted anywhere from 10 to 20 feet apart. Espaliering trees is another option if you want to maximize limited space. This involves training trees to grow on a trellis or wiring while they are young (1 to 3 years).

In Interior Alaska, all varieties of apple trees generally bloom at about the same time, so as long as trees are in the same general area, pollination shouldn't be a problem.

Plant your trees in good soil with plenty of organic matter (amend as necessary), and dig the holes wider than deeper, especially when working with colder soils. Long-term mineral amendments, such as rock phosphate or green sand, can be added at the time of planting. Water the hole with a low nitrogen solution

before planting and allow it to soak in. Add topsoil as needed when completing the planting and make sure the graft union is 1 or 2 inches above ground. With bare-root trees, soak the roots before planting. It may be useful to build a small circular berm about 2 feet from the base of the tree to help retain water and collect rainfall.

When planting new trees, additional fertilizer should only be applied early in the growing season (May to early July). Bone meal can also be added to soil when planting as an additional source of phosphorus. In the Interior, trees can be planted as late as mid-August or as long as the soil is workable, but do not fertilize if you plant late in the season.

Irrigation

Irrigating young apple trees is critical for the first two seasons while they are getting established, especially if they are in a high tunnel. Two to 5 gallons of water up to twice weekly (depending on air temperature, precipitation and humidity) will keep your young trees healthy. If the trees are bare-root, watering daily for the first two weeks will ensure ample irrigation until the roots have had some time to develop. Drip irrigation works well for young trees, as it is highly efficient and promotes a healthy root system. Sprinklers can also be used occasionally and can help reduce salt and calcium buildup, particularly if you are growing your trees in a high tunnel. Watering should be tapered off in late August/early September. Be sure the last watering is very thorough around the tree roots and in between rows. It is best to water before the first hard freeze.

Fertilizing

If you fertilize your trees, it is best to do it early in the season and perhaps only twice the entire growing season. This will ensure that your trees will harden off in the fall. Bone meal can also be applied to trees early to mid-season. If fertilizing, use a low nitrogen

Fruit Tree and Berry Crop Trial

Between 2007 and 2011, apples were grown both outside and in high tunnels at the University of Alaska Fairbanks Experiment Farm. While most varieties were able to grow both inside and out, some clearly did better growing inside the tunnel. There are also varieties that seemed to do better outside, but very few of them flowered and none produced fruit during the trial. The results of these trials are available at https://cms-prod-edit.uaf.edu/ces/ah/fruit-tree-trials/.

The following is a list of survival rates (%) for all the varieties planted, including both high tunnel and unprotected trees. Four to eight trees of each variety were planted.

Percent survival of all varieties planted from 2007 to 2011 (number of trees surviving/total planted).

Variety	High Tunnel (%)	Outside (%)
Advance	50	25
Alice	100	None planted
Altaiski Sweet	100	80
Arbordale	0	None planted
Arctic Red	80	67
Brookland	0	0
Carroll	100	100
Chinese Early Golden	67	0
Collet	100	0
Garland	67	50
Golden Uralian	38	50
Goodland	33	33
Heyer 12	100	60
Heyer 20	67	50
Lee 17	60	100
Lee 21	75	60
Norcue	67	40
Norda	67	67
Norhey	75	75
Norkent	0	0

Variety	High Tunnel (%)	Outside (%)
Norland	67	100
Norson	0	0
Northland	67	50
Novosibirski Sweet	50	67
Parkland	75	75
PF – 12	75	0
Prairie Magic	67	33
Prairie Sun	71	25
Red Heart	33	33
Rescue	57	40
September Ruby	0	0
Shafer	67	0
Summer Red	67	0
Trailmen	0	63
Ukalskoje Nalivnoje	100	100
8919	75	33
Prairie Sensation	67	33
18-18-9	33	25
18-18-11	50	50
21-61-69	67	100

fertilizer or an overall low complete fertilizer (e.g., 5-5-5). As mentioned previously, a long-term soil amendment (e.g., rock phosphate or green sand) can be used with newly planted trees. Apple trees do best with a soil pH that ranges between 6.3 and 6.7.

Weeding and Upkeep

Your trees will need regular weeding, particularly around the base of the tree. Grass between rows can help with weed control. However, planting grass directly under the trees is not recommended. Studies have shown that bare soil under trees can be advantageous in the spring in promoting soil warm up. It is not recommended to plant other crops or plants with your trees, at least not for the first couple of years while they are getting established.

Pruning should be minimal when the trees are young and should serve mostly to remove dead or damaged branches or to establish basic structure and promote early training of branch angles. Depending on the variety, a basic pyramid is a good shape to maintain early on.

Winter Preparation

If your trees are in a high tunnel, seal it as best you can with plastic to help retain heat. To avoid premature budding in early spring, monitor the heat carefully by opening the high tunnel in the daytime to prevent excessive warming and sealing it back up at night if temperatures are still chilly. Trees outside can be carefully wrapped in muslin or plastic for extra protection. Trees outside will also have the advantage of snow as insulation. Straw can be applied to high tunnel trees, but this should be done after the first freeze to reduce vole activity. As mentioned before, plastic or metal wire tree guards can be placed around young trees to prevent vole and rabbit damage during the winter months. These should be removed in the spring.

Remove any rootstock shoots or suckers at this time. All other pruning can be done in early spring, before leaf out.

Flowering and Fruiting

Trees in the high tunnels trial flowered as early as the second week of May and into early June. If the trees are in a high tunnel it can be difficult to determine when to open the end walls. To be safe, it is best to keep them closed until nighttime temperatures are fairly consistently above freezing in order to prevent damaging the buds. Water the trees as soon as the ground is thawed.

Once the fruit is set, the trees will need more water, so try to water regularly during this time. Thinning is also an important part of fruit management and can improve the size and quality of fruit. Thinning can be done after blossoming and can have a positive effect on the following season's crop. A general rule is to remove all but one fruit per cluster, with no fruit touching another. This can result in 90 percent removal. Sometimes, not thinning adequately can lead to biennial bearing, meaning a tree will produce heavily one year and not at all the next.

Harvesting

In the 2007-2011 trials, apples were harvested from mid-August to early September. Apples are best if ripened on the tree and consumed immediately after harvest, but they can be picked early and stored for a couple of weeks or months in cold storage, depending on the variety. Apples can also be picked earlier and set out to ripen, if necessary. Care should be taken not to bruise or damage the apples when picking. Generally, they will come right off when they are ready by lifting up and twisting the stem slightly.

What to do with all your apples

There are many ways to use and preserve apple, including drying, saucing, juicing, canning and baking. Apples can also be cored, sliced, dipped in a citrus solution and frozen for baking later. Fruit leather and, of course, apple pie are particularly delicious ways to use apples. For more information on preserving fruits and making fruit leather, visit www.uaf.edu/ces/pubs.

Thanks to Dan Elliott of Wasilla for sharing his experience and a wealth of information on growing apples in Alaska.

www.uaf.edu/ces or 1-877-520-5211

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